

DRAGON USER

International edition

96p US\$3.25 December 1985

The independent Dragon magazine

**Two dimensional
graphics**

**Machine code
made simple**

Torpedo!

Digital Dragons

**WIN Microdeal's
Trekboer!**

DRAGON USER



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How to submit articles

The quality of the material we can publish in
Dragon User each month will, in a very great
extent, depend on the quality of the
discoveries that you can make with your
Dragon. The Dragon computer was launched
on to the market with a powerful version of
BASIC, but with very poor documentation.

Articles which are submitted to Dragon
User for publication should not be more than
5000 words long. All submissions should be
typed. Please leave wide margins and a
double space between each line. Programs
should, wherever possible, be computer
printed on plain white paper and be accom-
panied by a tape of the program.

We cannot guarantee to return every
submitted article or program, so please keep a
copy. If you want to have your program
returned you must include a stamped,
addressed envelope.

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An amazing line up of five star games reviewed by our expert panel — plus some not so good.			
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Mike Gerrard gets even more space this month, by popular demand. He looks at two of Scott Adams' adventures, and answers the usual pile of queries from frustrated adventurers.			
Our second contribution this month from Steve Gethercole — a simple game aimed at teaching how to six year olds letter recognition.			
Roy Coates reviews a new peripheral for the Dragon from Cambridge based Laxdata.			
Gordon Lee sets the question, and includes a puzzling little Christmas bonus program — Microdeal provide 20 copies of Trekdoor as the prize.			

Editorial

THE OFFICIAL publication date for this magazine is November 20 — which means that you should all have read this before the 6809 Show. So you have no excuse not to go and support your machine.

If you are reading this at the 6809 Show, then you deserve praise for two reasons — firstly, having taken the trouble to show up and prove your loyalty to the Dragon, and secondly, because you've had the sense to buy Dragon User.

There will be a lot of other people at the show too.

Microdeal will be present in force, selling a number of games for the Dragon, including Mike Gerrard's new rave, Trekdoor: Compuseries will be taking up a large amount of space as well, selling amongst other things, the new £48 expansion board that can make your 64 a 128 (see Roy Coates review); Winterson will be selling Juxtaposition, another game Mike Gerrard fell over backwards about.

The list isn't endless, but there are plenty of other names as well: Cumans, Design Design, Trojan, CRL, Andtek, Baby, and our very own Pam D'Arcy to name but a few.

And of course Dragon User will be there, and our roving reporters will be doing quite a lot of roving so they can write a proper show report for a future issue.

What's more, over 2,000 people, the organisers say, have already bought tickets, so it looks like it's going to be a record breaking turnout. So just who isn't going to be there?

Well, it's unlikely that any representatives from the major high street retailers will be turning up.

Remember them? They're the people who decided the Dragon was dead, and nobody wanted to buy software and peripherals for it any more — or so they thought. They're the reason that you have to buy everything for your Dragon by post these days, unless you're lucky enough to live near one of the small independents who really know what there's a demand for.

Letters

This is the chance to air your views — send your tips, compliments and complaints to Letters Page, *Dragon User*, 12-13 Little Newport Street, London WC2H 7PP.

Powerless

COULD anyone at *Dragon User* tell me where I could purchase a transformer for my Dragon 32. I have tried Touchmaster, but they no longer stock it. Can the transformer be repaired or is it cheaper to buy new?

J. White

44 Downland Place
Adairton Road
Cardport Heath
Pole
Dorset BH17 7DR

Roll on!

I READ with interest your editorial in the October 85 issue which referred to the lack of effective marketing by some companies supporting the Dragon.

For myself I own a TRS-80 Co-Op 84, and I would like to see more companies providing compatible soft and hardware for both computers.

In the main it is the TRS-80 that is ignored — why is this?

There are over 150 Tandy branches in major towns, and cities in the U.K. alone. It must be an untapped market potential for most of these companies, and with the potential of an even bigger one.

I would also like to see *Dragon User* printing articles for the TRS-80, then I for one would be a regular purchaser of your magazine.

W. P. Flannery
140 Sevenoaks Road
Orpington
Kent BR6 3LZ

Pity the editor

PITY the poor Editor.

Make it simpler. Make it more complex. Make it all games. Don't give us any games — only utilities! It must be worse than being the Prime Minister or Leader of the Opposition.

Should I sympathise with G. R. Gurnee (October issue), we all have to begin somewhere at sometime and I suspect it will not be very long before he might grumble that he could do with something better than his old self (with respect to

those kids who happen to be very delinquent).

I hope he is carefully keeping all his copies of *Dragon User* for he will ultimately find them a most useful source of reference and ideas. I have every issue since No. 1, but being very short of time can only type a program when first published. Also I am not into games at all nor do I have a disk system, so offerings of this nature are rather wasted on me. However, I am very happy that other readers' interests are being covered since this makes the magazine more of a viable proposition. It would have to be much more expensive to cover merely my interests alone!

I think *Dragon User* continues to improve — roll on the D'Arcys, Cadges, Winklers et al, and dear Mr Editor please don't lower that standard (but add a little encouragement for the Mr Gurnees here and there).

Yes, people do type in long programs — I did Pam D'Arcy's Dissembler recently with much satisfaction.

B. Yeaman-Miller
Preston
Merseyside

Jet Set Willy!

I HAVE been "wandering" through Jet Set Willy's manual and have found 57 non-screens to fix. Can anyone tell me how many there are supposed to be?

Plus, is there a cheat as in *Masterblaster*?

H. James
34 Albion Street
Cardston
Rochdale
Lancs

THE NEXT letter may be of some interest to you — so should the information following R. . . .

Pokes!

THE following two programs will interest anyone who has purchased Jet Set Willy by Software Projects. Program A gives infinite lives and program B gives total immunity.

To use them type them in

and enter EXEC171. Your Jet Set Willy original will then load and run as normal but without infinite lives or immunity.

If you are hoping to complete the game, there are some things to be careful of. You need 99 objects to finish, no more and no less.

With infinite lives, endless loops can occur if you die at a monster's start position.

With immunity, endless loops can occur if you fall through killing blocks, ie the water in the bridge.

If you go to the top of the chain, an extra item is placed in the bathroom, so don't collect too many.

Program A
10 REM INFINITE LIVES.
EXEC 171 TO RUN
20 READ POKES, X=171,
M,X=X+1 IF X=15 THEN 30
30 DATA 18,208,0,285,189,
155,148,134,125,183,43,8,
128,0,0

Program B
10 REM IMMUNITY. EXEC
171 TO RUN
20 READ M,POKE, X=171,
M,X=X+1 IF X=32 THEN 30
30 DATA 18,208,0,285,189,
183,148,284,125,27,183,43,8,
183,43,11,347,43,20,128,0,0
Jet Set Willy
Afternoon

If the pokes don't work, then you could always try the codeword which allows you access to any screen so that you can practice the game. According to *Wonderful Play Codes* (where would you be without him?) the procedure is as follows:

- 1 Get the game running on any screen.
- 2 Press the M, A, and X keys at the same time.
- 3 Using the left and right arrow keys, select your screen.
- 4 Very quickly press the space bar and *Minor Willy* will appear in the middle of the screen.
- 5 Using the four arrow keys, position *Minor Willy* where you want him on screen.
- 6 Press the space bar and the game will start from that point.

Roy assures that this works on all copies of the game: if it doesn't work for you, this isn't because you've got a different version of Jet Set Willy, you aren't doing it right.

Excellent

I HAVE been reading *Dragon User* since it was first published and find it an excellent magazine. Could I venture to make a suggestion (well two to be exact) which would further improve it?

Firstly I would find an index to topics covered in articles and the answers page most helpful. It would save me hours of searching for the little bit of information I need. Perhaps you could give consideration to this on, say, a yearly basis.

Secondly, would it be possible to publish a list of the useful POKES which have appeared from time to time in various places. I am thinking of such things as the POKES for speeding up the operation of the computer and the one to calculate pressing -SHIFT->O in order to get lowercase. Meanwhile, keep on publishing your excellent magazine.

John Appleyard
Leeds

Black screen

I HAVE had my Dragon 64 for eight months and although I have attempted some Basic programming, my knowledge of machine code is nil.

Regrettably, I purchased the Gatoroom games cassette before the issue was published in the October edition of *Dragon User*. Jason O'Shea's views more or less sum up my own.

I have made a few minor changes, such as preventing the same word being selected repeatedly in *Execution*. However, as they all use a machine code loader, I have been unable to save these changes. Is there any way I can save these programs after entering them, and be able to load them again?

Also, can anyone tell me if it is possible in Basic to change the standard text format to green on black as I am sure this would be better than black on green?

Alan Green
2 Rydal Close
Burton Park
Stourport-on-Severn
Worce

HERE IT IS! The 22 screen, 60 level, See Sawing, Frog Slurping, Lift Catching, Apple Munching, Mind Blowing, Eddie Guiding, Arrow Dodging, Mountain Jumping, Laser Zapping, Airship Gazing, Boulder Hopping.....

EDDIE STEADY GO!



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BARRIERS — The Professor sits in his chair for the last 30 days, a long 30 days and has not returned — has he met with his play? Adventure £3.99 (T)

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BOTH GAMES £2.99

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 AT THE 6809**

? SHOW ?



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6809 Show

The 6809 Show looks like being the best supported ever, if the organisers are right in their estimates.

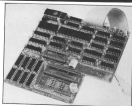
The list of companies attending is impressive — Microdeal, Tandy, Compuserve, Cumina, Design Design, Dalapex, Blaby, Peaksoft, Trijex, Greenwald, Smithson, John Pean, Mico Concepts, Andtek, Computape, Quickbeam, Incentive, Pericomms, Cambridge Main Processor, Modersoft, Software Projects, Gamesmanship, Winterset, Harts Moore, Lucidata, Greiner, Modem House, Computer Bookshops, the 6809 User

Group, the 48 Micro Group, and Dragon User. And that won't be all, by a long chalk.

Congratulations to all of them for supporting the Dragon.

Congratulations also to the 2,000 or so ordinary Dragon owners who have apparently already booked tickets, thus avoiding all that nasty queuing at the door.

There will be great numbers of new games and hardware on show, including Computer's new Dragon expansion board that turns your Dragon 64 into a 128, and your 32 into a 64. Winterset will be showing Juddaposters.



Incentive will have Andy Steady's Jet! Microdeal will have hundreds of new games, including Trekboar and Modem Man. Lucidata will have

the Dragon's Claw, a printer-adapter which gives your Dragon a BBC-style interface.

If you aren't there you only have yourself to blame.

Microdeal roadshow

ALL IS not gloom for Microdeal events following the company's recent announcement that Microdeal, Pocket Money, Bad Data, Speech, Microman and Salamander products would only be available by mail order from the Cornish company's Microcost division.

John Sykes, Microdeal's managing director, has copied

Radio One and organised a Microdeal Roadshow to bring his products to the public.

The Roadshow will be covering the length and breadth of England and a lot of Wales.

On November 2 and 3, it will be at UMIST in Salford Street, Manchester. On November 5 and 6, at the Civic Centre Exhibition Hall,

Newcastle Upon Tyne; on November 7, the Watney Hotel, Wellington Street, Leeds; on November 8, Royal QED, Aston University, Birmingham; on November 9 and 10, Sloane Hotel, Westgate Street, Cardiff.

Admission to the Show is free, and there will be lots of games, many of them at bargain prices.

And don't forget that Microdeal will also be at the 6809 Show, November 23 and 24, Royal Horticultural Halls, London. You'll have to buy tickets for that, though.

Memo to Microdeal: what about the Scots and the Irish? Microdeal is at 41 Turo Road, St Austell, Cornwall PL25 3JE.

DRS Rom

GROSS/SMITH Software has produced a Rom cartridge version of its database utility DRS, extending the size of database supported to 38,000 bytes, compared to 22,000 for the cassette version.

DRS was written by Mike Kern, who also wrote Grossware's Address assembler system.

Apparently, there are some very powerful features included — search, update and sort facilities amongst them.

DRS costs £18.40 on cartridge, and £10.35 on cassette, transferable to disc.

Greiner Software is at 2 Beacon Close, Seaford, East Sussex BN26 3JZ.

Meaning business

HARRIS Software is about to launch three new programs for Gregorians at Cumina One users. The three titles are a continuation of Harris' series of programs for home and small business use.

The first title is Stockbox, a stock control system which can record sales, customers orders, deliveries and supplier orders.

It can report on low stock, orders outstanding, stock valuation at cost or selling price, turnover and profit margins and a host of other things.

Outbox is an invoicing program which prints invoices onto either plain or pre-printed paper. It can be linked to Salesbox, Harris'

sales ledger program, or to Stockbox.

Sharebox is a share management program, which can be used to record the details of a portfolio of stocks and shares, and print or display valuations, capital gains, dividends and tax credits, and so on. It can also draw graphs of price trends.

Stockbox costs £18.95, Outbox and Sharebox £18.95.

Harris will be exhibiting for the first time ever at the Third 6809 Show, and will have all their software on display.

Otherwise, Harris Micro Software can be contacted at 25 Alexandria Road, Hounslow, Middlesex TW3 4HP.

Pamcomms plain

ONE OF Dragon User's best contributors, Pam D'Arcy — wizard of the keyboard — has finally decided to make some money out of her programming skills.

She has formed her own company — Pamcomms — dedicated to supplying top-priced, high quality software for the Dragon.

The first fruits of her labours, Pamcomms Plain Packs, will be on view at the 6809 Show.

Dropix is a PROCEED-4 graphics pixel editor for full screen or individual sprite

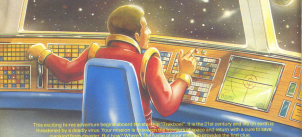
characteristic editing. Supplied on cassette with sample character sets, simple BASIC demonstrating programs and supporting documentation, it costs just £3.95.

Also on sale at the 6809 Show from Pam will be an Electronic Book Starter Pack at £1.95, and Golden Bytes, featuring an enhanced version of Dash Detective and a selection of other past magazine contributions, at £3.00.

Pamcomms is located at 21 Wycombe Lane, Woodburn Green, High Wycombe, Bucks. HP13 9AG.

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Actual screen shots from Dragon 32 version

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MICRODEAL

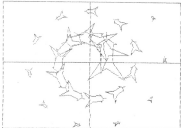
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The Dragon draws in two dimensions

Peter Whittaker demonstrates how to get the best out of a flat surface

THE DRAGON'S DRAW command is very powerful, but it does have its limitations. It is no great task to DRAW a square, and it is easy to move the square around the screen, but once complicated relations are required, the DRAW command starts to show its limitations since objects can only be rotated in ninety degree steps. There are similar limitations with the scaling ability of the DRAW command, and so, it would not, for example, be an easy task to draw a spaceship spiralling away from a planet, and getting smaller as it went (Fig #1). To accurately move objects around in two-dimensional space, we must abandon the DRAW command in favour of a co-ordinate based system. These co-ordinates can be manipulated, and then joined together using the LINE command. This way we will be able to improve on the scaling and rotation of the DRAW command, and also add shearing and reflection to our repertoire.

The equations used to manipulate the co-ordinates are recorded in the form of



matrices. This facilitates the combination of several operations into one equation. Table #1, using an anti-clockwise rotation as an example, shows how an object's co-ordinate system is multiplied with a matrix to give the object's new position. The result of this matrix manipulation is used in Listing #1 (lines 66 and 70) to

draw a rotating space ship. (Delete the REM statement in line 80 before running.) The origin has been moved to the centre of the screen. For a smoother rotation, change the STEP value in line 130. Table #2 gives a list of all the matrices we will need for object manipulation in two dimensions.

All of the matrices in Table #2 are for operations based around the origin (co-ordinates 0,0). If we try to use them to rotate an object that is not centred on the origin, the object may not move in the way we would like. Change line 66 for DATA 40,40,60,40,60,40,60,40,40 and RUN the program again. Instead of spinning about its centre, the square will orbit the centre of the screen. If we want the square to rotate about its own centre, we must first move it to the origin, then rotate it, and then move it back.

This would take three sets of matrix multiplications to do. However, the process can be much speeded up by first combining the matrices into one compound matrix. Table #3 shows how two rotations can be combined, and Table #4 works out the combined matrix for our square rotation program. GOTO lines 60 and 70 to DEF FN(A,B) = (X - 50)/COS(THETA) + (Y - 50)/SIN(THETA) + 50 DEF FN(B,Y) = (Y - 50)/COS(THETA) - (X - 50)/SIN(THETA) + 50 and RUN the program again. Now the square rotates about its

$$\begin{pmatrix} X_2 \\ Y_2 \end{pmatrix} = \begin{pmatrix} X_1 \\ Y_1 \end{pmatrix} \times \begin{pmatrix} A & B \\ C & D \end{pmatrix} = \begin{pmatrix} AX_1 + BY_1 \\ CX_1 + DY_1 \end{pmatrix}$$

$$\begin{matrix} X & Y & 1 \\ \sin & \cos & 0 \\ \cos & -\sin & 0 \end{matrix}$$

$$(X_2, Y_2) = (XA + YB, XC + YD + F, SE + YB + I) \quad (C \text{ and } H = 0)$$

$$(X_2, Y_2) = (XA + YB, XC + YD + F)$$

$$\begin{pmatrix} X_2 \\ Y_2 \end{pmatrix} = \begin{pmatrix} X_1 \\ Y_1 \end{pmatrix} \times \begin{pmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{pmatrix}$$

$$= (X\cos\theta + Y\sin\theta, -X\sin\theta + Y\cos\theta, \#X + Y + 1)$$

$$(X_2, Y_2) = (X\cos\theta + Y\sin\theta, -X\sin\theta + Y\cos\theta)$$

Table 1. Object manipulation by matrix multiplication.

$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
Identity	Rotation clockwise	Reflection Y-axis
$\begin{pmatrix} S1 & 0 & 0 \\ 0 & S2 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
Scaling	Rotation anticlockwise	Reflection X-axis
$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$	$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ TX & TY & 1 \end{pmatrix}$
Shear X	Shear Y	Translation X,Y

Table 2. Matrices for origin centered object manipulation.

$\begin{pmatrix} a & b & c \\ d & e & f \\ g & h & i \end{pmatrix} \times \begin{pmatrix} j & k & l \\ m & n & o \\ p & q & r \end{pmatrix}$
 Matrix 1 Matrix 2

Multiply each row in matrix 1 by each column in matrix 2.

Top line = $\begin{pmatrix} a\cdot j+b\cdot k+c\cdot l \\ d\cdot j+e\cdot k+f\cdot l \\ g\cdot j+h\cdot i+i\cdot l \end{pmatrix}$
 Centre line = $\begin{pmatrix} a\cdot m+b\cdot n+c\cdot o \\ d\cdot m+e\cdot n+f\cdot o \\ g\cdot m+h\cdot o+i\cdot o \end{pmatrix}$
 Bottom line = $\begin{pmatrix} a\cdot p+b\cdot q+c\cdot r \\ d\cdot p+e\cdot q+f\cdot r \\ g\cdot p+h\cdot r+i\cdot r \end{pmatrix}$
 (a+b+c d+e+f g+h+i)
 (a+b+c d+e+f g+h+i)
 (a+b+c d+e+f g+h+i)

Table 3. How to multiply two matrices to get one compound matrix

$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ TX & TY & 1 \end{pmatrix} \times \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \times \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ -TX & -TY & 1 \end{pmatrix}$
 Translation Rotation Translation
 = $\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ (TX\cos\theta+TY\sin\theta-TX) & (-TX\sin\theta+TY\cos\theta-TY) & 1 \end{pmatrix}$
 = $\begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ (TX\cos\theta+TY\sin\theta-TX) & (-TX\sin\theta+TY\cos\theta-TY) & 1 \end{pmatrix}$

Table 4. Matrix combination, Translation to origin a rotation x translation back.

own centre, and does not obey the origin. The same process of matrix combination can be carried out to include scaling, shearing, reflection, and variable translation.

Restores the original rocket co-ordinates to line 80, and EDIT lines 80 and 70 to DEF PLOT(Y)=R*S*COB(THETA)+TX*COB(THETA)-TY*SB(THETA)

=Y*SB(THETA) and DEF PLOT(Y)=R*S*SB(THETA)+Y*S*COB(THETA)+TX*SB(THETA)+TY*COB(THETA). Add lines 120: TX=20*Y-8.5+1 and 130: S=3*8*TX/TX+3 where S=the scale, TX=the translation along the X-axis, and TY=the translation along the Y-axis. Now RUN the program and you will see the spaceship spiral out from the centre of the screen, getting smaller each time it moves, until it eventually disappears from the screen (Fig #1).

Slow

The program works well, but it is quite slow. It can be speeded up by reducing the amount of number crunching carried out. Instead of reading the co-ordinates from data statements each time, we can read them from an array. Secondly, if we update the co-ordinates each time we move the object, we do not need to keep on recalculating the matrix values every time. Instead we can use the same matrix each time on our updated co-ordinate system. Listing #2 demonstrates the increase in speed of operation using this approach, running at about twice the speed of listing #1. To help with this, listing #3, where RUN will calculate the resulting matrix when two matrices are entered for multiplication. The result matrix can be used in the DEF PLOT statements to modify the movement of an object.

Fast

This is about as fast as we will get with 'real time' two dimensional graphics, without resorting to machine-code. Unfortunately, this is still not good enough for use in animation sequences. If we want better graphics, we must resort to 'off line' animation (listing #4). This technique involves splitting the program into two halves, and running them separately. The first half does all the number crunching, it calculates the spaceship co-ordinates as it spirals around the planet, but instead of drawing in the spaceship, the data is saved to high memory. The second half of the program then does all of the drawing. The data has been poked into high memory, and so all that needs to be done is to peak the data and draw to the co-ordinates indicated.

When RUN, select option #1, and the program will take several minutes to calculate the data. Eventually it will crash when the spaceship moves the extremes of the screen, and the program tries to poke a number greater than 255 or smaller than 0 into memory. Run the program again, and select option #4. This will draw in the spaceship as it spirals around the screen. The increase in speed is quite dramatic, with hardly a pause between each movement of the ship. The data can be saved to tape by selecting option #2, and reloaded by option #3. This saves the long wait of the data calculation section of the program. The program can be easily modified to manipulate different shapes (change the DATA line) through different movements (change the DEF PLOT lines). Try it and see.

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LISTING #1. SPACESHIP SPIN

```

8  POKE4495,0:"HIGH SPEED POKE"
10  "*****INITIALIZE*****"
20  POLERR=0
30  RESTORE:NUM=0
40  READ A:IF A<999 THEN NUM=NUM+1:
    GOTOD8
50  NUM=NUM/2-1:"COUNT HOW MANY SETS
    OF CO-ORDINATES"
60  DEF FNAX(X)=COS(X)*THETA+Y*SIGN(TH
    ETA):X=X*ROTATION
70  DEF FNKY(Y)=Y*SIN(THETA)+X*SIGN(TH
    ETA):Y=Y*ROTATION
80  DATA 0.40,15.00,10.00,10.00,0
    0.0,-10.0,30.0,30.0,-10.0,-10.00,-1
    0.0,0.40,0.00:"CO-ORDINATE DAT
    A FOR SPACESHIP"
90  DATA 000
100  "*****DRAW*****"
110  PPOKE4,1:"POL=SCREEN1,0:"DISPLA
    Y SCREEN
120  LINE(125,0)-(125,191),PSET:LINE
    (0,91)-(255,91),PSET:"DRAW SHIP
    AND"
130  FOR THETA=0 TO 6.3 STEP .1:"ROT
    ATION"
140  GOSUB(70)-NEXT THETA
150  STOP
160  "*****DRAW*****"
170  PPOKE4,0:"POL=DRAWING SCREEN"
180  LINE(0,91)-(255,91),PSET
190  LINE(125,0)-(125,191),PSET
200  RESTORE:READ X,Y:"READ CO-ORDIN
    ATES"
210  LINE(FNAX(X)+125,91-FNKY(Y))-(FNA
    (X)+125,91-FNKY(Y)),PSET:"SET LI
    NE TO START CO-ORDINATE"
220  FOR A=1 TO NUM
230  READ X,Y
240  LINE-(FNAX(X)+125,91-FNKY(Y)),PSE
    T:"DRAW IN OBJECT"
250  NEXT A
260  FOR A=1 TO 4:"COPY A=4 TO A=NEX
    T:"COPY TO DISPLAY SCREEN"
270  RETURN
280  "C) 1995 PETER WHITTAKER

```

LISTING #2. SPACESHIP SPIRAL

```

8  POKE4495,0
10  POLERR=0:PPOKE4,1:"POL=SCREEN1,0:
    PPOKE4,0:"POL"
20  RESTORE
30  READ A:IF A<999 THEN NUM=NUM+1:
    GOTOD8
40  NUM=NUM/2-1
50  DIMX(NUM),Y(NUM)
60  RESTORE
70  FOR A=0 TO NUM
80  READ X(X),Y(Y):"READ CO-ORDINATE
    S INTO ARRAY"
90  NEXT A
100  DATA 10.0,10.40,25.00,20.00,20.
    0.40,-30.10,-10.00,-30.00,0.0,0.0
    0.0,-5.00,10.40,10.00
110  DATA 999
115  S=.95:S0=SIN(.0):C0=COS(.0):"SC
    AL=SIGN(THETA)*COS(THETA)
120  "*****DRAW ROUTINE*****"
130  POLS=LINE(0,91)-(255,91),PSET:L
    INE(125,0)-(125,191),PSET
140  X1=X(X)+Y1=Y(Y)+Y2=X(X)+Y1,00:
    Y2=Y(Y)+Y1,00:"TRANSLATION TO PR
    ORIGIN"
150  FOR A=0 TO NUM
160  A1=X(X)+X2=X(X)+Y2=X(X)+Y2
    X2=X(X)+Y2+Y2
170  A2=X(X)+X2=X(X)+Y2=X2=X(X)+Y2
    Y2=X(X)+Y2+Y2
180  X=X(X)+Y(X)+Y2:NEXT A:"CO-ORDI
    NATE UPDATE"
190  LINE(X1+125,91-Y1+125)-(X1+12
    5,91-Y1+125),PSET:"SET LINE TO OR
    JECT START POINT"
200  FOR A=2 TO NUM
210  LINE-(X(X)+125,91-Y(Y)),PSET:"D
    RAW LINES"
220  NEXT A
230  FOR A=1 TO 4:"COPY A=4 TO A=NEX
    T:"COPY TO DISPLAY SCREEN"
240  GOTOD8
250  "C) 1995 PETER WHITTAKER

```

LISTING #3. MATRIX *C MULTIPLY

```

10  CLS:PRINT#0 0 0 0 0 0
20  PRINT#0 "E H A B C H"
30  PRINT#0 "I C F I"
40  PRINT#MATRIX 1,...."
50  FOR A=1 TO 5
60  INPUT#0A(1+A):"..."INPUT#0A(2)
70  NEXT A
80  PRINT#MATRIX 2,...."
90  FOR A=1 TO 5
100  PRINT#0A(5+A):"..."INPUT#0A(6)
110  NEXT A
120  CLS:PRINT#0,"SOLUTION":PRINT

```

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TELEFON

```

130 PRINTTRK 1:TRK 1:TRK 4:TRK 2:TRK 7:TRK
   (3:3)
140 PRINTTRK 18:TRK 1:TRK 4:TRK 5:TRK
   7:TRK 6:3)
150 PRINTTRK 28:TRK 1:TRK 7:TRK 2:TRK 8:3)
   4:TRK 3:TRK 6:3)
160 PRINTTRK 2:TRK 1:TRK 5:TRK 2:TRK 8:TRK
   (3:3)
170 PRINTTRK 18:TRK 2:TRK 4:TRK 5:TRK 6:3)
   4:TRK 8:TRK 6:3)

```

```

180 PRINTTRK 28:TRK 2:TRK 7:TRK 5:TRK 8:3)
   4:TRK 8:TRK 6:3)
190 PRINTTRK 3:TRK 1:TRK 6:TRK 2:TRK 9:TRK
   (3:3)
200 PRINTTRK 18:TRK 3:TRK 4:TRK 6:TRK 8:3)
   4:TRK 9:TRK 6:3)
210 PRINTTRK 28:TRK 3:TRK 7:TRK 6:TRK 8:3)
   4:TRK 9:TRK 6:3)
220 'A.C. 1985 PETER WHITTAKER

```

LISTING #4. OFFLINE SPIRAL

```

10 CLEAR200,20000:'PROTECT MEMORY F
   OR OBJECT DATA
20 POW=255.9
30 '#####ETIAL#####
40 PCLEAR0
50 RESTORE:HUM=0
60 READ A:IF A<999 THEN HUM=HUM+1:
   GOTO60
70 HUM=HUM+2:1:'NUMBER OF CD-ORIGINAR
   TES
80 CLS:PRINT11,"SPACESHIP":PRINT:P
   RINT"SELECT CHOICE:1-"PRINT"1...
   _CALCULATE DATA":PRINT"2...SAVE
   DATA":PRINT"3...LOAD DATA":PRI
   NT"4...RUN DATA"
90 INPUT A:ON A GOTO 120,390,400,200
   0
100 GOTO 90
110 '#####CALCULATE DATA#####
120 DEF FNPKX=>X/360*COS(THETA)+TX/CO
   SX(THETA)-TY/SIN(THETA)+Y/SIN(
   THETA)+L25
130 DEF FNPKY=>-(X/360*SIN(THETA)+Y/
   COS(THETA)+TX/SIN(THETA)+TY/CO
   SX(THETA)+L25
140 TX=20:TY=-10:5*1:'TRANSLATION A
   LONG X&Y AXIS AND SCALE
150 DATA 0,40,15,30,10,30,10,0,30,-
   30,0,-10,-20,-20,-10,0,-10,30,-
   15,30,0,40,0,50
160 DATA 999
170 BYTE=20000:'PROTECTED MEMORY
180 FOR THETA=0 TO 50 STEP .1:'ROTA

```

```

   TION STEP
190 S=0,1:20:TH=T0+.3:'SHRINK RATE &
   SPIRAL RATE
200 RESTORE
210 FOR A=0 TO HUM
220 READ X,Y
230 POKE BYTE,FNPKX>:POKE BYTE+1,FN
   PKY<:BYTE=BYTE+2:'SAVE UPDATED
   CO-ORDINATES
240 PRINTBYTE
250 NEXT A:THETA
260 GOTO90
270 '#####DATA DATA#####
280 BYTE=20000
290 PHO=4,1:'SCREEN1,0
300 PHO=4,0:'FOLS
310 LINE(0,95)-(255,91),PSET-LD=0:1
   25,0)-(125,101),PSET
320 LINE(PEEK(BYTE),PEEK(BYTE+1))-
   (PEEK(BYTE),PEEK(BYTE+1)),PSET
330 BYTE=BYTE+2
340 FOR A=1 TO HUM
350 LINE<PEEK(BYTE),PEEK(BYTE+1)),
   PSET:BYTE=BYTE+2:NEXT A
360 FOR A=1 TO 4:PCOPY A+4 TO A+HEX
   T
370 GOTO 380:'LOOP
380 STOP
390 OPEN"DATA.ROT":20000,20000,0:
   GOTO90
400 CLOSE"DATA.ROT":GOTO90
410 'A.C. 1985 PETER WHITTAKER

```

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180000-0000, 000000, 0000 0000 0000-10, 10 0000 0000

Machine code made simple

Ray Collinson with some simple machine code routines

HAVING WRITTEN a machine code routine for the SERIE screen, I also wanted to include some text, PRINTING or POSITIONING BASIC being undesirable in this case. The pseudo-op POC-FORM CONSTANT CHARACTER was the obvious instruction to use, but the problem was in retrieving the characters stored in memory and PRINTING them to the screen. The immediate requirement seemed to be to set a pointer to a memory location, store the operand in a register then send it to the screen.

The ACCUMULATOR-OFFSET INDEXED instruction seemed most appropriate in pointing to and retrieving from memory any characters stored there by the POC instruction. Using both accumulators, it is written #LDA 0,Y. This means take the current value held in the Y register, add it to the address held in the X register, and store the operand to the A accumulator ready to PRINT to the screen.

Enter listing #1 and, when assembled, GSAVE a copy before SERIEating. If you are uncertain about the function of lines 180 and 280, delete or REIM each line, re-assemble and EXECUTE.

If you have studied any physics you may

remember reading about Drocke's Dark Spaces. What you should have is the Dragon's dark spaces. We are in effect POKING data to memory and, since there is no CHR\$ equivalent to POK\$ (see introducing Dragon Machine Code Pp 68-67, by Ian Sinclair), the Dragon gives an inverted space. This means that we need to change the data stored in the A register.

You understand, of course, that numbers are stored and used in binary form. For a space, we have in the A register Hex 20-decimal 32, or in binary 00100000; the number that the DRAGON requires is decimal 96 or in binary 01100000, which is the POC\$ equivalent of CHR\$ 32. The EXCLUSIVE OR operation returns a 1 if either one of the operands is a 1. So, if we logically OR 64 and 32 together...

```
00100000 32
+ 01000000 64
= 01100000 96
```

We get

In other words, set bit 6 in the A accumulator ready to store in video memory.

The comments in listing #1 should adequately explain the remainder of the program.

Listing #2 shows a slightly different

method in lines 100 onwards. Line 105... LDA X,LOAD\$ EFFECTIVE ADDRESS X loads 40 in the X register and sets up the video memory address where the next line of text is to be displayed. Line 130 finds the first character, in this case a space; the data in the Y register is LOADED into the A accumulator and the Y register is then incremented. This is rather a tortuous method but demonstrates how registers can be manipulated.

Listing #3 inverts the first text line so it is not necessary to carry out any operations on the spaces. However to invert the text we need to reset bit 6. To see why this is so, type into listing #1 POC "A LINE OF TEXT" in SERIE 0 inverted characters.

To reset bit 6 we need to carry out an EXCLUSIVE OR operation on the A register. The XOR returns a 1 if one and only one of the operands is a 1. Now the ASCII code for A is binary 65 in binary 01000001 and for A inverted, which is what we want, it is 00000001, so if we XOR, which contains 65 with 64, to reset bit 6, we get:

```
01000001 65
+ 00000000 64
```

We get 00000001 01

and we get an inverted character.

The remainder of the program follows the same structure as the previous listings.

Listing #4 was originally a subroutine and so the register values had to be preserved, but on its own the POK\$ and PUL\$ instructions can be left out.

The first text line is inverted by the program but by setting the routine back in RAM at address \$B844 you can enter text in SERIE 0 mode. This is an implemented PRINT routine. If you use the SERIE 0 mode the spaces between words will be unchanged, as a modification to the prog-

LISTING #1

```
10 REM ***** SERIE *****
20 REM ***** LISTING #1 *****
30 REM *****
40 REM *****
50 REM *****
60 REM *****
70 REM *****
80 REM *****
90 REM *****
100 REM *****
110 REM *****
120 REM *****
130 REM *****
140 REM *****
150 REM *****
160 REM *****
170 REM *****
180 REM *****
190 REM *****
200 REM *****
210 REM *****
220 REM *****
230 REM *****
240 REM *****
250 REM *****
260 REM *****
270 REM *****
280 REM *****
290 REM *****
300 REM *****
310 REM *****
320 REM *****
330 REM *****
340 REM *****
350 REM *****
360 REM *****
370 REM *****
380 REM *****
390 REM *****
400 REM *****
410 REM *****
420 REM *****
430 REM *****
440 REM *****
450 REM *****
460 REM *****
470 REM *****
480 REM *****
490 REM *****
500 REM *****
510 REM *****
520 REM *****
530 REM *****
540 REM *****
550 REM *****
560 REM *****
570 REM *****
580 REM *****
590 REM *****
600 REM *****
610 REM *****
620 REM *****
630 REM *****
640 REM *****
650 REM *****
660 REM *****
670 REM *****
680 REM *****
690 REM *****
700 REM *****
710 REM *****
720 REM *****
730 REM *****
740 REM *****
750 REM *****
760 REM *****
770 REM *****
780 REM *****
790 REM *****
800 REM *****
810 REM *****
820 REM *****
830 REM *****
840 REM *****
850 REM *****
860 REM *****
870 REM *****
880 REM *****
890 REM *****
900 REM *****
910 REM *****
920 REM *****
930 REM *****
940 REM *****
950 REM *****
960 REM *****
970 REM *****
980 REM *****
990 REM *****
1000 REM *****
```

LISTING #2

```
10 REM ***** SERIE *****
20 REM ***** LISTING #2 *****
30 REM *****
40 REM *****
50 REM *****
60 REM *****
70 REM *****
80 REM *****
90 REM *****
100 REM *****
110 REM *****
120 REM *****
130 REM *****
140 REM *****
150 REM *****
160 REM *****
170 REM *****
180 REM *****
190 REM *****
200 REM *****
210 REM *****
220 REM *****
230 REM *****
240 REM *****
250 REM *****
260 REM *****
270 REM *****
280 REM *****
290 REM *****
300 REM *****
310 REM *****
320 REM *****
330 REM *****
340 REM *****
350 REM *****
360 REM *****
370 REM *****
380 REM *****
390 REM *****
400 REM *****
410 REM *****
420 REM *****
430 REM *****
440 REM *****
450 REM *****
460 REM *****
470 REM *****
480 REM *****
490 REM *****
500 REM *****
510 REM *****
520 REM *****
530 REM *****
540 REM *****
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620 REM *****
630 REM *****
640 REM *****
650 REM *****
660 REM *****
670 REM *****
680 REM *****
690 REM *****
700 REM *****
710 REM *****
720 REM *****
730 REM *****
740 REM *****
750 REM *****
760 REM *****
770 REM *****
780 REM *****
790 REM *****
800 REM *****
810 REM *****
820 REM *****
830 REM *****
840 REM *****
850 REM *****
860 REM *****
870 REM *****
880 REM *****
890 REM *****
900 REM *****
910 REM *****
920 REM *****
930 REM *****
940 REM *****
950 REM *****
960 REM *****
970 REM *****
980 REM *****
990 REM *****
1000 REM *****
```

```
1000 REM *****
1010 REM *****
1020 REM *****
1030 REM *****
1040 REM *****
1050 REM *****
1060 REM *****
1070 REM *****
1080 REM *****
1090 REM *****
1100 REM *****
1110 REM *****
1120 REM *****
1130 REM *****
1140 REM *****
1150 REM *****
1160 REM *****
1170 REM *****
1180 REM *****
1190 REM *****
1200 REM *****
1210 REM *****
1220 REM *****
1230 REM *****
1240 REM *****
1250 REM *****
1260 REM *****
1270 REM *****
1280 REM *****
1290 REM *****
1300 REM *****
1310 REM *****
1320 REM *****
1330 REM *****
1340 REM *****
1350 REM *****
1360 REM *****
1370 REM *****
1380 REM *****
1390 REM *****
1400 REM *****
1410 REM *****
1420 REM *****
1430 REM *****
1440 REM *****
1450 REM *****
1460 REM *****
1470 REM *****
1480 REM *****
1490 REM *****
1500 REM *****
1510 REM *****
1520 REM *****
1530 REM *****
1540 REM *****
1550 REM *****
1560 REM *****
1570 REM *****
1580 REM *****
1590 REM *****
1600 REM *****
1610 REM *****
1620 REM *****
1630 REM *****
1640 REM *****
1650 REM *****
1660 REM *****
1670 REM *****
1680 REM *****
1690 REM *****
1700 REM *****
1710 REM *****
1720 REM *****
1730 REM *****
1740 REM *****
1750 REM *****
1760 REM *****
1770 REM *****
1780 REM *****
1790 REM *****
1800 REM *****
1810 REM *****
1820 REM *****
1830 REM *****
1840 REM *****
1850 REM *****
1860 REM *****
1870 REM *****
1880 REM *****
1890 REM *****
1900 REM *****
1910 REM *****
1920 REM *****
1930 REM *****
1940 REM *****
1950 REM *****
1960 REM *****
1970 REM *****
1980 REM *****
1990 REM *****
2000 REM *****
```

```
2000 REM *****
2010 REM *****
2020 REM *****
2030 REM *****
2040 REM *****
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2970 REM *****
2980 REM *****
2990 REM *****
3000 REM *****
```

ers will be required if this is not desirable. In this program, to insert the text we logically OR the A register with \$2 and to put in a blank space we OR the accumulator with 120. The PRINT routine at 0054AA requires that the ASCII codes are stored in the A register only. In order to put the text at a specific screen position, it is necessary to use the cursor address at locations 0000-000A. LOAD the X register with the required screen address then STX \$00 and the 16 bit address is then stored in the

Keywords: *depression, mood, mood disorder, mood disorder with anxiety, mood disorder without anxiety, mood disorder with anxiety, mood disorder without anxiety, mood disorder with anxiety, mood disorder without anxiety*

Before returning to BASIC, you will have to re-locate the cursor position at some appropriate place on the screen. For example, if you want to return the cursor to the same position, then `$400.LD00` `#4000`, `$TR $00`, puts it in the top left hand corner of the screen.

Those readers not possessing an assembler should input the Hexadecimal numbers in the OBJECT code and write a **HEXA2DATA** program to store the data.

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This program is not written in an ideal format, since you will notice that there are repeated instructions which are unhelpful and waste memory; the object, though, is to familiarise beginners with the ways in which the registers and memory can be handled.

Listing #9 uses a HCM routine to PRINT to the screen and the address is repeatedly called as a sub-routine, which makes it compact, fast and tidy.

[illegible][illegible][illegible][illegible][illegible][illegible]

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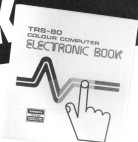
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This month we take a look at the graphics and sound sections of the Dragon's ROM. These can be usefully used in machine code programs for setting up elaborate displays, and for playing music, but for fast action games customised routines will be needed.

Graphics and Sound Memory Map

The following decimal addresses are those used by the graphics and sound commands on the Dragon and Tandy machines.

104	Data for low-res SET-RESET routines
176	Current foreground colour in use
176	Current background colour in use
180	Temporary colour in use (colour given as parameter in command to override default settings)
181	Byte value for current colour (ie the value stored in a byte to set all pixels to that colour)
182	Prode-graphics mode number in use
182/184	Address of the last byte of the current graphics display
185	Number of bytes used per line in current graphics mode
185/187	Address of the first byte of the current graphics display
188	Start of graphics pages (MSB). Defaults to 586, ie address 1536 — changed by Dragoncode etc
189	Current X cursor position — not user available
191	Current Y cursor position — not user available
193	Colour set currently in use
194	Plotting flag (0=reset, non-zero=on)
195/196	Current horizontal pixel number
187/198	Current vertical pixel number
199/200	Current X cursor co-ordinate
201/202	Current Y cursor co-ordinate
203/204	Circle command X co-ordinate
205/206	Circle command Y co-ordinate
208	Circle Radius
210	Current angle to be used in DRWW routines
230	Current scale to be used in DRWW routines
140	Sound pitch value
202	Current Octave in use (0-4)
223/224	Volume data for current volume setting in PLAY routines
225	Current note length for PLAY routines
226	Current tempo for PLAY routines

Graphics and Sound Firmware Routines

The following ROM routines can be used from machine code programs. The details of various commands like circle and point are not given, as they cannot easily be used as stand alone routines, but see the 'GRAPH' routine.

Set VDO Mode
Dragon 43481 Tandy 38296
Sets the VDO into the mode given in the A register. The mode will be displayed immediately.

Set VDO Offset
Dragon 43421 Tandy 38415
Sets the display offset for a graphics mode, eg to start a display at address 1536 the A register would contain 0 on entry. This routine also takes account of disks etc, so the same result will not occur if disks are attached — if A=0 then the display will start at graphics page 1, otherwise that is.

Select Page
Dragon 43489 Tandy 38483
On entry the B register contains the Prode page number to be used in subsequent graphics routines.

Select Col Set
Dragon 43538 Tandy 38530
Selects either colour set zero or one, depending on the value of the B register on entry.

Select VDO Col
Dragon 43428 Tandy 38423
Selects the required VDO colour set from the data in location 182.

Set Colours
Dragon 43264 Tandy 38268
Sets up the locations 188 & 189 from the data in locations 184 and 178/179. (See Memory Map for details.)

Select Display
Dragon 43580 Tandy 38514
Selects either TEXT or GRAPHICS modes depending on the Z condition code. If Z=1 then text, else sets up a display in current Prode location 182, starting at the address in locations 186/187.

Reserve HRG RAM
Dragon 43586 Tandy 38540
Reserves RAM for graphics and moves Basic programs if necessary. The B register holds the number of pages to be reserved — ie this routine does a PCLEAR.

Clear Graphics
Dragon 43607 Tandy 38601
Clears the current graphics screen to the data in the B register on entry.

Calc Pixel Pos
Dragon 47656 Tandy 43225
On entry the top of stack must contain the low res vertical co-ordinate, preceded by the horizontal co-ordinate. On return the X register contains the address of the byte containing the low res pixel, and location 128 will contain the OR data for the pixel.

Set LRG Pixel
Dragon 47683 Tandy 43148
On entry the X register contains the screen address, the B register the colour and location 188 the OR data. The Pixel will be plotted on the low res screen.

Reset LRG Pixel
Dragon 47623 Tandy 43148
As for 'Set LRG Pixel' above, except the B register is ignored and the pixel is reset to black.

DRWW
Dragon 45137 Tandy 40118
This routine allows access to all the facilities of the DRWW command. Its use is, as follows. On entry location 188/187 must point to a string of characters consisting of normal Basic commands, the first character must be code 34, and the last must be code 0. The A register should also contain 34 on entry.

Enable Sound
Dragon 47613 Tandy 43582
Enables 8 bit sound by setting bit 3 of the hardware location 65215.

Disable Sound
Dragon 47611 Tandy 43580
Disables 8 bit sound by clearing bit 3 of the hardware location 65215.

Beep
Dragon 47776 Tandy 43245
This routine sounds a beep for the length held in the B register. The pitch is set by location 140.

Play Note
Dragon 44696 Tandy 38676
The A register contains the ascii code of the note to be played. The various octave, tempo, volume and note length settings should be set up in memory before entry. (See memory map for details.) Sound must be enabled before calling this routine (see 'Enable Sound' routine).

This is the fourth in Brian's series on the Dragon's Rom routines. Next month, he will be covering Basic variables.

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Juxtaposition

Software: Juxtaposition, Wiersoft, 30 Uplands Park Road, Enfield, Middlesex EN2 7PT
Price: £6.95

IT'S WELL OVER twelve months now since Wiersoft's last Dragon adventure, *Return of the King*, but the time's been well spent judging by the quality of their new mega-tale, *Juxtaposition: Baron of Cell V*.

Fans of their earlier quests may or may not be delighted to know that there isn't a ring in sight in this new one. It's a completely fresh story — well, fresh to Dragon adventures, though players with access to other machines might spot resemblances to adventures such as *Snowball*. *Return of the King*, most of all, *Lords of Midnight*. What, you say, all this on a Dragon? Almost, as the program must be a masterpiece of compression, with no subsidiary programs loaded, as has happened in the past.

You are *Croak* — no, not because you've bought the adventure, but just happens to be your name, and you live on the planet *Cell V* as a fairly low grade servant, the planet being split into colour-coded sections and each one ruled by the appropriate Baron. You and a few million others are sentinels to Baron White, living in a domed city in the middle of his lands.

The game begins with you waking in your tiny, poorly decorated apartment, a sort of *Cell V* council chat, with seemingly the bare minimum for a happy existence: a bed and a fireplace. A message comes through on the Vido-phone, the equivalent of a Royal summons. It's Baron White himself sending you on a suicide mission to the lands of Baroness Black to find out why her hasn't attended the last few cabinet meetings and discover if she's got her hands on the secret of *Juxtaposition*, enabling her to cross the line of dimensional instability which passes right through *Cell V*. Got that? Right, off you go.

As you're undertaking this mission on behalf of the Baron himself, you'd think he'd give



you a bit of co-operation and protect you from the dreaded droids which are patrolling the corridors outside your apartment, but no, you have to deal with them first, but that's not too difficult with a little careful observation of their movement habits. This first section is basically a text adventure, with a small picture of the domed city in the upper right of the screen. The text has been redefined for easier reading and a more attractive layout, and occupies the bottom half of the screen.

Superior

Examine every object you can and you should find a way of getting down to a slightly superior set of apartments below yours, and if you can deal with the patrolling droid here you get yourself a blue key card allowing you through the locked doors that lead to the city itself.

Almost immediately you come across an airlock, though something tells me it's not wise to step through here just yet. Wandering round the 'Wireless Red Zone' for a while convinced me I was heading nowhere fast, but after finding a mentor I was able to travel to four different parts of the city, in one of which was an ultra-modern Lasertheatre, with a girl saying 'Let's Dance.' After unpleasant Terrain Trials and being accused of making improper suggestions, I left her for a while and explored elsewhere. This led to me finding a breather mask, at which I rushed for the airlock and

found myself outside the domed city.

Out on the surface of the planet itself the game switches to a *Lords of Midnight* landscaping style of game, though you're still entering text commands underneath. The top half of the screen shows your current view and you can look in any of the eight compass directions, with the up arrow key moving you forward in the direction you're facing. The speed with which your viewpoint changes is incredible, faster even than *Lords of Midnight*, I would say, and you can whizz around the landscape — graphics have obviously been kept simple, and you do notice slight duplications of mountains and forests here and there, but this doesn't detract from the very impressive effects. Don't whizz round too quickly, though, I sat off in one direction and found myself in the lands of Baron Red, unable to get back again before I was spotted by the *Baronial Choppers*. Not being able to furnish the appropriate ID card, I was capped without mercy. Come you, Red Baron!

Thanks to the *SAVE* facility I returned to Baron White's domain, and made sure I stayed there. I found a pyramid which I was able to enter, but the only thing inside was a wide cavern leading nowhere, so that's something to come back to later. I eventually found a key, inside which was a maze of pillars, not to mention ever-present electronic eyes watching me, but at last I made contact with the Baron himself, who gave me a red ID Tag. Scouring through the Red Baron's lands I found another pyramid, a tower, and eventually a domed city bearing a remarkable resemblance to the white one I'd left. In fact it was identical — almost. But it did give me chances to stock up on food from the dinner droid and restore my health to a safe state — you have to eat once a day, with *SCORE* showing you not just what percentage of the game you've done, but your current bill of health.

Out again on to the planet, I eventually had to find the home of Baron Red, but such is my luck I wandered off into Baron Brown's lands and was reduced to a pile of prodding

adventurer yet again. All this playing, and still only 80% completed. Mapping the planet's surface is a tricky business, as there are apparently 4,000 locations, and of course you can make off in any one of eight directions from most of them, the exceptions being the mountains which border the map. You have to really keep your eyes open and try to spot potentially interesting buildings in the distance, then head for them. If you want to map this lot properly I'd suggest you go out and buy yourself a roll of wall paper.

Complex

As if 32,000 viewpoints wasn't enough, the last journey is equally complex, coping with long sentences — yet ironically having trouble with shorter ones, sometimes. You have to try several variations on a command to fit upon the right combination of words. You can also speak in other characters, using notation marks, such as *RAY TO DINNER DRAGON*, *TAUSAGE*, *BARON DRAGON*, *TAUSAGE*, *BARON DRAGON*, *TAUSAGE*, as well as get them to carry things for you, but so far I've only found the ultra-complex game and a few droids so I think there's more of this still to come.

After a couple of days' play, the adventure itself looks like it's going to be fairly straightforward, and possibly a little repetitive — I sincerely hope that when I get to the Red Baron he isn't going to give me a Brown ID Tag, which I then take to the Brown Baron etc. But I still have a few objects I haven't yet been able to make use of, so maybe it'll get more complicated than that. And I've also a feeling the apparent simplicity of the cities is going to be deceptive. Apart from these slight reservations, then, I'd say *Juxtaposition* looks like being one of the best programs you're likely to see on your Dragon this side of Christmas, and maybe even the other side as well. Programmer John Humphreys deserves all credit for squeezing more into the Dragon than you'd have thought possible, and my guess is it'll be an even bigger seller than Wiersoft's earlier successes.

Mike Gerard



Dark Star

Program: Dark Star, Design Design, 125 Smedley Road, Manchester M8 7NS.
Price: £7.95

FROM 1983 people who brought you *Romney's Revenge* and *Labyrinth*, *Star Wars* *Tatooine Army* comes quite simply the best 3-D game for the Dragon since — you guessed it — *Romney's Revenge*!

Dark Star puts the player in the role of Luke Skywalker, Captain Starbuck, Buck Rodgers, or any other space hero from *Orb Wars* to *Star Trek*, flying through space, diving towards the planet to loot law and destroy everything else, in *Star Wars* that George Lucas would be envious of!

The game places you literally in the pilot seat of a small craft. The controls are simple. By adjusting your sights you also control your rati, climbing and diving. You can fire accelerators, and decelerate. And that is it for controls. Very simple, right? Wrong. At least not when there are what seem like 15 billion alien ships casually there are actually two or three! All spanning the full equal hemisphere upon your tiny little craft.

The game is very simple in fact so simple that it could become boring after a while, but seems to have an extraordinary addictive quality that makes me want to keep playing for just an hour and then suddenly hours later.

There are enough options to set up a game for every day in the year, and they can certainly cater for any player's level of expertise. You can choose to use one or two joystick options or set his own keys for keyboard play.

You then choose difficulty level, type of enemy missile, and other options and launch into space.

The game operates in 3-D and is graphically stunning. The graphics are simple but beautifully effective and the speed at which they moved seems to have no effect on the smoothness and clarity of screen action. The planet is depicted simply and effectively and the feeling of diving and climbing is quite superbly gut-wrenching!

The game is a must. I have given it five stars. It probably only deserves four and a half as I'm not yet sure of its

durability, but seeing as Design Design have done this on the Dragon thus confirming to support our mice with quality software it gets five!

Jason Orban



Trekboer

Software: Trekboer, Microdeal, 41 Turo Road, St Austell, Cornwall.
Price: £8.00

A MERE graphics quest to gladden the hearts of *Dragon* adventurers, coming as it does from the same stable which produced *Shogunians*, *Sea Quest*, *Black Starium* and *Castle Island* and just in case you'd forgotten those you'll be reminded should you find the advertising leaflet hidden somewhere — is the first five locations.

The screen layout is identical to those earlier titles, as is the style of the graphics with their occasional moving sections and flickering lights — flickering in this case because you're aboard the *Trekboer*, a spaceship from the 21st century when life on earth is threatened by a deadly virus. All you have to do is search the known universe till you've found a cure. No problem.

First location is the control room, with a couple of buttons to press, a plaque and a view screen to look at, and a ladder to climb up. Moving around, there's a transporter room, duty storage room, communications room and environmental control room. There's also a pitch black room, which I haven't yet figured out how to illuminate, and a few personality useful objects. After a certain number of moves a message comes through from River Comol telling you that plague is still rampant. Kanto is the only known cure, there's been no contact with the *Veldboer* spaceship for three months and their last known co-ordinates were 0000.

Setting the controls for 0050 brings up a planet on the view screen. Next step was a little tricky, but after being ejected into space a few times I finally worked out how to get down

onto the planet's surface, and if nothing else than the graphics here are even more interesting. Your view of the planet scrolls across the graphics window, and after a little searching I found the wretched *Trekboer*, a virtual copy of the ship it's just left, except that everything is dead and empty — though that wretched pitch black room is still there.

I don't want to give too much away, but something here should show you a way of visiting a frozen planet, and there you might learn something to help you find your way to a beautiful garden planet, though not as beautiful as it might sound as I plunged to my death here trying to cross a bridge that wouldn't bear my weight. Nasty, but not as nasty as returning to earth, I imagine, which I haven't yet tried to do.

The adventure unfolds nicely, opening up well yet you somehow always have to leave something behind that you're sure you'll need to go back to. A convincing story and some nice effects, and I think an even better effort than its enjoyable predecessors. I can see the questions in the adventure column already!

Mike Gervard



Ready Eddy?

Program: *Edie Ready Go!*, Incentive Software, 54 London Street, Reading RG1 1SQ.
Price: £5.95

TITLE FOR another novel! This game is all the usual adjectives for brilliant combination



with another few thousand that you've never heard of (except I've made them up) so I haven't bothered to print here!

This is a deceptively simple concept that sees a lot of *Edie Miller* (surprise!) but has also successfully devalued it into something less complex, but even more exciting and addictive.

The story starts that having finally escaped the vicious satyr-like tests (as in *Black Friday*), this guy Eddie now has to go through a crazy obstacle course that the notorious programmer has designed for him.

There are three controls (left, right, and — you guessed it — jump), and the aim on each screen is simply to get Eddie from one side of the screen to the other, via a mix, left to right.

To stop him are arrows, lizards, frogs, pits, rivers, etc. and they are usually (although not always) coming from the other side of the screen. It takes a bit to manoeuvre, especially the look of the early stages.

The thing that sets this game up above its brothers is (as is usually the case with quality programs) its design. The screens really do get progressively more difficult, with screens that appear simple (throw in a wall, of course, have a catch (the invisible one being a screen involving simple precise running and jumping but with a horrifically short time limit).

I've hardly stopped playing *Edie Ready Go!* since I got it. There are 22 screens, I'm on number 17 but progress has become slow in comparison with the early screens. One of the most notable things about it is the way that individual people had different screens easy (one man's thing is another man's other thing, or something like that).

It plays through at the normal speed, and then when all 22 screens are complete, it plays again at medium speed, and then fast.

The sound is more than vaguely "Shaper"ish but then one can't have the perfect game, that would be too much to ask. This one is nearly there though.

Last but not least — and you can quote me on that!

Jason Orban



Show ?

Program: Show-jump, Carri-
pularware, PO Box 336
Stoke-on-Trent ST6 6UX
Phone: 09 50

I, PCRB (me), have never really had much interest in show-jumping, probably due to a dated fear of horses! However, that is not to say I do not know what it involves. I would be able to tell the difference quite easily between, for example, show-jumping and organised crime, or, to use a more appropriate example, show-jumping, and Computerware's Show-Jumpers software.

Years ago, in rules, there was a real little game called *Shuriken*. What you had to do was drive a cute little graphic Hell's Angel biker over ditches and jumps.

In this game, you control a cute little Princess Anne as she frots over various jumps. The ramps have gone, the game is now more complex: you have a jump button.

This game has been badly classified (and anyway the "home" could just as easily be a stunt bike with the quality of definition). That is not to say it's a bad game. It's just lost some of its prospective market. I mean surely something like *Speedy Gonzales* would sell more copies than *Showtime*?

Thus, within the last decade, in creative industries:

I'd love to be able to go on to say that the game itself was a superbly addictive challenge. Oh well, another unrequited love!

Shut jump consists of a horse jumping fences of various lengths and heights spaced over several lines on the screen (the horse goes left to right on the top line, then the second, and so on to the end of the event). The controls are accelerate, decelerate, and jump. Basically, you want a lot of speed for the long jumps and very little for the short ones. And there's a

There are nine courses, which would be nice if there was any real variation between them other than slightly taller and longer jumps, more frequently on the later day courses.

The game has a "jump-off" option for two tying competitors which I was fortunate enough never to require. All in all it does seem to be a well written and thought out program.

It is said that this game is so (...) tack and ... ugly word alert ...) boring. It just doesn't make the want to beat it. It is suffering from the length-grab syndrome.

1000



and [7]. Whenever there is a request for data the "format" required is displayed at the top of the screen.

For quickly locating entries a "short-form" of the name is entered for each record. For example, for Fred Smith one might use SM-F. This short-form is also used by the program for sorting the records into alphabetical order before access.

Requests for information are signalled by a flashing cursor enclosed within a bracket. System prompts such as "Press any key" appear on the bottom line of the screen as do any error messages generated. Pressing the down arrow key with shift produces a line of help information at the bottom of the screen which cuts down on repeated references to the manual. Pressing shifted up arrow returns you to the main menu, that is, it aborts the option selected. Similarly, the Irish key has been disabled and has no effect.

Once you have entered your data, a card, if necessary, to be edited by selecting the option from the main menu. Records are selected by entering the Short-form of the name. The program will attempt to find the nearest match for you if you include the "wild card" character "?". For example, if you want to edit the record of a *lily* Smith, but can't remember his first name, you might enter *lily-S?* as the short-form. When a match is found you can either accept it to edit, or scroll forward or backwards through the file.

This method of retrieving records is also used for the "view", "delete" and "print" options. When printing is selected the program can make use of another field that can be entered for each record, the "salutation" field. This is the "Dear Fred" part of a letter head. The program always prints "Dear", so it is only necessary to enter the "Fred" part in the salutation field.

A final option in the Mailbox menu is to "Run Report Program". This loads and runs another program from the Mailbox disk, used for most of the printing options. The Report program allows address labels to be printed; the user can set the horizontal and vertical tabs for the particular type of labels being used.

(Most of the Report Program options depend on selecting batches of records using selective keys on the fixed and user-defined fields. It is possible to select certain names, towns and regions all once again. The testing on user fields is possibly more useful. The tests available are `greater than`, `less than`, `equal to`, `not equal to`, `and`, `or`, `not`. As an example, if a file contains a user-defined field, number 15 which is called "Occupation", you could select only the records where occupation is greater than 10 by the following test # 10 = `Greater than 10`.

In addition to "IF", "Either" and "OR" is allowed, several tests can be combined for very powerful selection of particular records. The other main option of the Report Program is to display or print selected fields from selected records in the form of a report, with automatic totalling of numeric fields.

There are two more programs on the Master disk, "MAIL.PURGE" and "MAIL.MERGE". The former allows selected records to be deleted in bulk from a file, and the latter allows different files to be merged together. Neither of these two programs use the 42-column screen, which seems to tarnish the professional feel of the software a bit. I would suggest that these two programs were either hurriedly written to get the software out

Mailbox is undoubtedly the best Name & Address file management program I have seen running under DragonEdit. The screen display is excellent, the keyboard has a variable autospeed speed, and the help messages make the program very user-friendly.

The manual is also very well written with useful examples. With its very powerful selection options and user-defined fields this program is ideal for a small business which needs to hold simple customer records, or a club or society. The price is also just about right for disk software of this type. Harlow deserves to do well with *Mailbox*.

Not perhaps one for the Christmas stocking, though — unless your loved one is a small business!

Figure 6



Mailbox software

Program: *Alibon*, Harris
Micro Software, 49 Alexandra
Road, Hounslow, Middlesex
TW9 2HP
Below: C&A 300

ADDISON is a new name and address database program for the Dragon 32 and 64 with Dragonator, from Harris Micro Software, the company that produces the Moneybox program.

As with Monkeys (last review), Mailbox uses Intertec's custom 42x24 screen and keyboard driver which produces a very clear and pleasant display, including full lower case and so on. Mailbox can handle up to 66 separate lists on one disk (named MAIL01 to MAIL66) of variable length. Each list contains records of names and addresses plus up to 10 user defined facts.

¹ The author is grateful to the referees for their comments.

file drives, and has extensive input error checking. The first thing to do is to select the **CREATE** file option. Information on the size of the file and the number of user defined fields is required for the program to then create the empty file on a data disk. *Mathcad* always assumes that you only have a single disk drive, so prompts are output to swap program and data disks when each prompt.

The idea behind user-defined fields is that you can store extra information, such as occupations or ages, about each person on the file. These user-defined fields are given names and formats by another option from the main menu. Three formats are available. "Alpha" simply means any character. "Num" means numeric only, and "Date" means only dates will be accepted. The characters D, U,

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C SAVE

I HAVE been trying to write a program which has to read in a program which has been saved by CSAVE.

When I save a program this way, I always get an IO error at the beginning of the last block of information when loading it back in.

This means I cannot load or read the last block, is this a common fault, or have I got a problem with the computer?

C Lockwood
Pymouth
Devon



RE P007 (S.Y.P.): NEXT X,Y
FOR S070 I/M

30 S70 P2

500 P1 RM0 I
510 P2 RM0 I

JMP S0940 for Endpoints) rather than a RTI.

It is not necessary to 'call' an interrupt from a program; the routine will automatically be executed every 50th of a second transparently to the program running at the time. If you want to use interrupts which are called from the program you should use 'Software Interrupt', initiated by the SWI instruction. The address of the interrupt routine should be stored in locations 316-319 and the routine should end with a RTI. The SWI instruction automatically saves all registers and the RTI automatically restores them.

The following program reads in a program previously saved with the CSAVE command line by line. This could be used as part of a custom editor for example. You should not get IO errors with this program; if you do then the most obvious fault is your cassette deck, or less likely the computer itself.

```
10 GOTO "T" -1, -1
20 IF ROP (-1) THEN GO
30 LINE INPUT A-1, A2
40 PRINT A2
50 S070 20
60 CLOSE -1:PRINT "END-OF-FILE"
```

P POINT

COULD you please write a small program demonstrating PPOINT and how to use it. The manual isn't a lot of help as it doesn't actually give a very good example.

I am a complete beginner and am trying to teach myself programming.

Linda Pugh

The PPOINT command seems to create more confusion than most graphics commands. Its purpose is to return the colour of the pixel at the specified position. The program below should demonstrate this by changing any green pixels to blue and any red to yellow on every other line.

```
10 PPMODE 1,1:PCLS:SCREEN
1,0
20 COLOR 4,LINE (10,10)-
(50,50),PSET,0P
30 LINE (10,50)-(200,100),
PSET,0P
40 FOR Y=0 TO 101 STEP 4
50 FOR X=0 TO 150 STEP 2
60 C=PPOINT (X,Y)
70 IF C=4 THEN PC=0
80 IF C=1 THEN PC=3
```

Variable pick up?

I'VE been working on a machine-code routine that needs to pick up specially reserved variables incorporated in a Basic program, look through the Basic Variable table and, after converting the byte floating point number to an integer, pass it to the machine code table.

Something is not right, as all the variables return the same number from the first variable name — as in the short program example below:

```
10 CLS
20 FOR P1=0 TO 512
30 FOR P2=0 TO 256
40 DIMVARS (P1, P2, etc)
50 NEXT P2
60 NEXT P1
```

The variable P2 returns the same value as P1.

Inside the Dragon has been my main source, especially the 'Number Representation' section, but I need more help.

Richard Brooks
Croydon Surrey CR0 3DE

The simplest way of incorporating a routine such as this is to use the EXEC command with parameters. For example, the Envelope command could be written as a routine at address 30000 which could be called as:

```
40 EXEC 30000,P1,P2
The first part of the routine would read as follows
10 OP0 30000
20 JSR 30142:Skip comma
30 JSR 30483:Set P1 in X
40 S7X P1
50 JSR 30142:Skip comma
60 JSR 30483:Set P2 in X
```

Beeb data

IS it possible to transfer data from a BBC computer to the Dragon 64? I wish to use a large amount of data and so cannot transfer it directly into the Dragon. I have a disk drive and the BBC data is on disk.

Peter Bennett
Hindley
Worcester

The BBC disk format is not directly compatible with the Dragon disk system. The easiest method of transferring data is to use an RS232 link. The Dragon's BLOAD command could be used, but this would mean writing code on the BBC to send data in a standard Dragon file format. A simpler solution would be to write a small program on both computers to send and receive the data on a character by character basis, saving the data to disk on the Dragon as it is received using PWRITE.

Interrupts

I HAVE recently been trying to understand the use of interrupts and how these are initiated in a program. My interest is in their application in games programming.

E Tomlinson
Preston

The START address of an interrupt routine is placed in locations 298-270 and the routine must end with a JMP 40281 (or

Structure

I AM attempting to structure my Dragon Basic.

I would be grateful if you could help me overcome some of the problems I have encountered.

How does the Dragon evaluate such expressions as (A-C) OR (A-B)?

How do I access and use CLDRAM, CLORG and SUFFY?

Kevin Cascard

The Dragon, in common with most Basics, evaluates boolean expressions, such as (A-B), as 0 for false, and -1 for true. In fact, the Basic will allow any non-zero value to signify a 'true' value.

For details of the Cassette I/O routines see Chapter One: October 1985. The evaluation routines you mention return the value of the following number in the B and X registers respectively. The only pointer used is the 'Text Pointer' at address 156/157 which should point to the first character of the expression.

Dancing

WHICH locations are affected by sound input from the cassette player? I wish to write a bar graph program which will 'dance' to the music entered from the tape.

N.A. Stalter

The ONLY hardware location affected by the cassette input port is SPP70 — bit 0. By sampling this bit a number of times in a loop, it is possible to obtain the frequency of the sound coming in which can be used within a 'bar-graph' program such as you describe.

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MIKE GERRARD'S ADVENTURE TRAIL

CHRISTMAS is coming, the goose is getting fat, and no doubt if you put a few pennies into Adventure International's hat they'll be delighted to supply you with your choice of Scott Adams' adventures this Yuletide. Which you choose is up to you, but whichever it is I doubt if you'll be disappointed with the challenge of a Scott Adams title. The two I'll be looking at this month have very distinct scenarios. *Pirate Adventure* should obviously cater to the pirates amongst our readers, whilst *Hoodoo Castle* should cater to . . . well, we won't go into that.

Pirate Adventure is actually the second in the lengthy Adams' series, and was in fact written by Scott jointly with his wife Alexis. Scott's first adventure, *Adventureland* (reviewed last month), allegedly occupied so much of his spare time that his wife at one point put the master disk of the game in the family oven. Fortunately for all concerned she didn't turn the oven on, and obviously it didn't take long for her to be bitten by the adventure bug herself. For her first attempt at authorship she chose a desert island setting, though the opening location seems to be fully sun-drenched, being a flat in London: a hush-drum-drum, as Arthur Daley might call it. At first it looks just like any ordinary flat, with a pair of sneakers lying on the floor, a rug, a

discarded bottle of booze, a sack of crockery. A sack of crockery? No doubt there'll be a parcel lurking somewhere. And what's that sign on the wall? "Bring treasures here, say Scott."

Nailed

Taking what I could (the rug proved to be nailed to the floor) I went upstairs to an attic, in which there was a backdoor, in which there was a back, in which there was a wind written in blood on the floor! Yikes. Sounds suspiciously like a magic word to me. The book itself is *Treasure Island* and another message informs you that Long John Silver left two treasures there, which must be mine to Robert Louis Stevenson but let's not quibble. There are a couple more locations in the flat, if you can find them, and then it's out to a window ledge, provided you've done something to prevent yourself falling to the pavement far below.

Go everything right and you might find yourself on a sandy beach on some tropical isle. Resisting the temptation to get out the towel, sub in the sun-lan cream and settle down with the latest Jeffrey Archer paperback, I examined the lagoon and found that lately the tide was out. I waddled lustily into the lagoon, found an impenetrable rusty anchor, went north and promptly discovered that I was out, out of the game and in "Never-never-land," from where every direction takes you nowhere. You can usually escape from a Scott Adams death, but seemingly not this one. I returned and had the sense to explore the island before venturing into the lagoon again, and it's a good job I did, although I don't think so while I was wandering around the maze of caves.

Apart from *Never-never-land*, *Pirate Adventure* had only 25 locations, and if you think that's small then *Hoodoo Castle* is limited to only 22! With very little by way of text, you could probably fit these adventures into an unexpanded ZX-81, maybe even a pocket calculator, but with Scott Adams it's the puzzles that matter and it will take you a goodly while to uncover those pretty few locations, believe me.

Hoodoo Castle is written solely by Alexis Adams and "dedicated to all miners." The mors among my readers will no doubt see that's a good reason for buying it, while those with mine might feel it would make an excellent Christmas present. What,

your mom doesn't like adventures? All the more reason, then, fix a, or your mom, begin the game in a chapel with nothing but a closed coffin for company. Taking our life in our hands we use the magic words OPEN COFFIN and discover not a rotting corpse but a sign saying "Count Greto's been cursed! There's one way for him to feel 'I'm in, and he'll go free!' What can it all mean? And what about the man wearing the sapphirine ring? Is he dead or alive? Who cares, give that ring back, it's bound to come in useful somewhere."

Heading north I walked into a room where the window slammed shut instantly, and wouldn't open again. I left that problem for later and headed south, which brought me to a dingy-looking stairwell and a dagger with an open jail cell. It didn't seem a good idea to enter here just yet, so I poked the pocket shovel that was lying around and went instead into the torture chamber. I couldn't get through the tiny door that requires a bit of magic, but did go into the armory which contained a shield, a sword and a suit of armour. Or rather a suit of armor, this being an American adventure. Strangely, you could MOVE ARMOR, but nothing happened when you did.

Witch's brew

Next I wandered my way past a room full of animal heads, another room with a pot of witch's brew, and finally into a lab containing several interesting items. There was a jar of lag, which I naturally tried to get in touch with the (a-)is man statue I'd already found. No dice, it was stuck to the floor. There were some chemical tubes, though using these only prompted one of them to explode periodically and eventually kill me. There was also some labelled chemicals. I was informed, an examining them, that they appeared to be mixable. Is this a good move? Maybe not. By the time I found a secret tunnel leading to a slippery chute down into another room, the exploding tubes had got me . . . what a painful way to go.

For all their brief text and few locations, I think any adventurer worthy of the name ought to try tackling these titles from the Adams family.

Philip Standell of Bognor Hill has been living a later Scott Adams effort, his adventures (if there is such a word) of Spideeman, and has kindly sent in a few clues for the benefit of other readers.

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PIRATE ADVENTURE

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Scott Adams

When you can't go any higher in the elevator, **PUDDING DOWN** (LHSLUP) is the fix is proving a problem. **TITLE DOWN** (DOWNS) and if hypomania is a problem is you. **MIND DOWN**.

Another helpful reader is Alan Matthews of Nottingham, who has sent me a copy of the introductory notes that should accompany *Diablo*. Alan thought those readers who have bought the adventure without the cassette may might appreciate a copy of these, so if anyone would, then write and ask me nicely, as well as enclosing a stamped addressed envelope, and I might just send you one. If you're well into the game then it won't help you much, but if you're having trouble getting started then it might prove useful.

O Eames of 10 Kent Close, Perryerby, Clevedon OH 462 is having trouble with *Mystery of the Java Star*, having spent many late nights on board a shipwreck looking for the Java Star. If anyone can help him, or for, please write to him, or him, at the above address. Any reader who sends in SAAG with their queries will be sure to get a reply, but the naughty ones who don't will have to wait till the letter can be dealt with in the column itself. If you can't bear to wait several weeks for it to appear, the answer's simple: **EASE YOUR MIND**.

Gerrard Saunders didn't even include an address with his queries on *The Red Froggy*, so if you want to write again, Gerrard, I'll do my best for you (we're very pushed for space, this month).

Not too pushed to thank S & Woodbury of Bromsgrove who sent me a map of the various forests in *Mistral of Storms*, along

with some playing hints. Someone obviously making use of the school holidays, as the letter came from the end of August. One tip from among many refers to moving the snake. **TAKE THE SNAKE DOWN RIGHT DOWN**.

Help on *Black Sanctuary* is offered by John Toomes, 19 Lakeside Court, Boreley Hill, West Midlands DY5 3RD, but John asks for a stamped envelope as his pocket money doesn't stretch very far. A hint on *Spygy* from R A Reed of Manchester, who points out that there are no space suits without holes in them, but to join the corridor type: **HIT THE ROAD**. Oh, that should help Andy Hughes of Hemmelsford, who wrote in asking about just that point.

Damian Griffiths of 163 Sparrow Avenue, Burnley, Lancs BB1 2 5AS seems to have completed about six million adventures, but not *Spygy* (for which he'd like someone to tell him how to obtain the communications). Some tips on *Quest*, which Damian's discovered, are that to gain items you can drop a minor quantity and you can also double your wealth by selling your coins for 1/10 coins each.

Thanks

I'd like to thank all the readers who have written in with queries and offers of help, and apologise if I haven't featured your letter because space doesn't allow a mention of them all. One I would like to mention is from Gillian Keys of Bangor in Northern Ireland, who asks for some general help on vocabulary for beginners to adventure games. This is something I think we forgot once we've played a few, but it's very important to get used to those abbreviated two-word commands. **LOOK WINDOW**,

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GO DOOR etc are common commands which seem to baffle some players. You can't use **GO THROUGH** (LH DOOR) **PASSAGE/TUNNEL** or whatever, so simply **GO DOOR**. Likewise with looking at or through things, and the command **LOOK** often is a synonym for **EXAMINE**. That's something you must also learn to do. **EXAMINE** everything. This sometimes enables you to find concealed objects or secret passages, and some adventures even require you to **EXAMINE** some things twice, to produce two hidden objects. Always make a map, of course, and always read this column. More tips next month.

Adventure Contact

To help puzzled adventurers further, we are instituting an Adventure Helpline — simply fill in the coupon below, stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Helpline.

Adventure
Problem:

Name:
Address:

line, 12/13 Little Newport Street, London WC2H 7PP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have Adventure Trail to write to as well!

Dec 85

Adventure Contact

Adventure Return of the Ring Problem How do I get the red/blue passes? How is the fix for the Ring? Name Christian May Address 6 Swift Gardens, Westcliff, Southamption, Hants, SO8 0PD.

Adventure Frankins Tomb Problem How do you get into the Water Tomb? How do you give the robot the catalyst? How do you open the Sanctuary? Name J P Thorne

Adventure Black Sanctuary Problem How is it got through the boarded-up door (the one doesn't help)? Name Stephen Wood Address 3 New Street, Stalybridge, Cheshire, SK9 2EL.

Adventure El Diablo Problem I'm stuck in the cactus and all I did is going up on the Granite rock. Name Eyal bar on

Address Eyal Street 8/5, Knyal Bialik 27000, Israel.

Adventure Return of the Ring Problem How do you get the moon walker in the inventory? Name Ian Griffin Address 59 The Serpentine, Aughton, Nr Ormskirk, Lancs L26 5BA.

Adventure Dragon Mountain Problem How do I get a drink of water? Name L. Durnell Address 62 Riverside, Grays, Essex, RM16 4BD.

Adventure Calico Island Problem How do you get past the natives on Calico Island?

Adventure Broog Problem How do you use the transporter co-ordinates on the transporter? Name Louise Gifford Address 7 Water line, Westthorpe, Sandy, Beds, SG9 6XH.

Adventure El Diablo Problem Where do I dip the stick, how do I get to the cave in the cliff? Name Fraser Chalkers

Address 47 Ibbot Close, Kempston, Beds, MK43 9DU.

Cat and mouse!

A game for four to six year olds from Steve Gathercole

THE IDEA of the game is to teach four to six year old children the alphabet and the position of the keys on the keyboard. When run, the game displays two little houses, one for a cat and one for the mouse. A letter is presented in the middle of the screen and the child must press that key, if the key is not pressed quickly enough or the wrong key is pressed the cat will start to catch the mouse. The idea is to get home before the cat gobbles you so! The alphabet is displayed in order and

there are three levels of difficulty. Mum or Dad should try their hand at level one — but be careful, you could show yourself up!

APPARATUS — BL = blank, MO = mouse down, MJ = mouse up, MR = mouse right, ML = mouse left, CR = cat right, CL = cat left, HD = house

VARIABLES — DY = cat 'y' position, CX = cat 'x' position, MY = mouse 'y' position, MX = mouse 'x' position
LINES 85 — 340 poses graphics to screen

and sets up arrays

LINES 350 — 450 data for the graphics

LINES 460 — 620 data and routine for drawing letters on the high res screen

LINES 630 — 800 sets up and displays introduction screen

LINES 890 — 1000 main loop

LINES 1010 — 1030 subroutines for cat and mouse movement and check for end of screen positions

LINES 1040 — 1060 count free time

LINE 1080 death march

MOUSE

```
10 REM MOUSE
20 REM FOR 4 TO 6 YEAR OLDS
30 CLS:PRINT@;"CAT AND MOUSE";
40 PRINT:PRINT"*****
*****"
50 PRINT:PRINT:PRINT:PRINT"  AM A
  LPHABET TEACHING GAME";
60 PRINT:PRINT:PRINT"    FOR THE
  VERY YOUNG...";
70 PRINT:PRINT:PRINT:PRINT:PRINT:P
  RINT:PRINT"    HANG ON A MINUTE"
80 POKE 3,1:CLS
90 DIM BL(15),HD(15),MU(15),MR(15)
  ,ML(15),CR(15),CL(15),HO(15)
100 DIM LE#(26)
110 GOTO 200
120 A=1536
130 FOR B=0 TO 3
140 FOR N=1 TO 24
150 READ S:POKE A+B,S
160 A=A+32
170 NEXT N
180 A=1536:NEXT B
190 RETURN
200 FCL@:GOSUB 120
210 GET @,@ - C@,240,HD,G
220 FCL@:SET @,@ - C@,240,BL,G:GOS
  UB 120
230 GET @,@ - C@,240,MU,G
240 FCL@:GOSUB 120
250 GET @,@ - C@,240,CR,G
260 FCL@:GOSUB 120
270 GET @,@ - C@,240,HO,G
280 FCL@:GOSUB 120
290 GET @,@ - C@,240,CL,G
300 FCL@:GOSUB 120
310 GET @,@ - C@,240,MR,G
320 FCL@:GOSUB 120
330 GET @,@ - C@,240,ML,G
340 FCL@
350 DATA 0,0,0,0,0,0,0,1,5,5,5,5,5,1
```

```
,1,5,5,5,13,1,1,0,0,0,0
360 DATA 00,16,16,16,64,64,0,64,64
  ,64,64,64,0,0,64,64,64,192,0,0,0,0
  ,0,0
370 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0
380 DATA 0,0,0,0,1,1,7,5,5,5,5,1,1
  ,5,5,5,5,5,1,0,0,0,1,5,0,0,0,0,0
  ,120,64,64,64,64,0,0,64,64,64,64,0
  ,0,64,64,64,0,0,0,0,0,0,0,0,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
390 DATA 0,0,0,64,60,16,4,4,4,4,4,
  17,60,64,60,64,64,64,64,64,16,5
  ,5,0,16,20,20,16,16,160,0,20,145,6
  5,0,5,5,0,4,64,1,1,1,1,64,65,65,0
  ,16,60,60,16,16,160,120,96,0,0,0,64
  ,64,0,0,0,0,0,0,0,64,64
400 DATA 0,0,0,1,4,16,65,16,16,16,
  16,16,16,16,16,16,16,16,16,16,1
  6,16,21,20,20,65,0,0,0,65,0,5,4,4
  ,5,0,0,0,0,65,65,65,65,65,65,0
  ,0,0,64,16,4,65,4,60,60,60,60,4,4
  ,4,4,4,4,4,4,4,4,4,4,4,4
410 DATA 0,4,5,5,4,4,42,2,7,32,0,0
  ,1,1,0,0,0,0,0,0,0,0,1,1,0,4,20,20
  ,4,4,42,32,24,70,65,0,60,60,0,16,2
  1,64,64,64,64,21,65,65,0,0,0,1,5,0
  ,16,16,16,16,16,60,17,21,5,1,1,1,1
  ,1,1,4,60,60
420 DATA 16,65,60,60,70,21,1,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
430 DATA 60,60,65,140,141,60,60,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
440 DATA 64,60,60,65,65,64,60,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
450 DATA 1,5,37,65,65,1,5,0,0,0,0,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,5,21,65
  ,65,67,5,21,0,0,0,0,0,0,0,0,0,0,0
  ,0,0,0,0,0,4,65,61,61,145,64,64,0
  ,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
460 FOR K=0 TO 26:READ LE#G@:NEXT
  K
470 FOR K=0 TO 7:READ MU#G@:NEXT
```

```

400 DATA BR2,ND4R3D2ML2MD2BR2,ND4R
3D2ML2F2DML2BL4BR2,NR3D4R3D2BR4BR2,ND
NR2FD2ML2BR4BR,NR3D2NR2D2R3D4BR2
470 DATA NR3D2NR2D2BR4BR,NR3D4R3D2
L2C2BR,04BR3D2ML2U2BR2,ND4BR2,0D4R
EU2L2R2BR2,D2ND2NF2E2BR2
500 DATA 04R3D4BR2,ND4FTREND4BR2,N
D4F2D4BR2,NR3D4R3D4BR2,ND4R3D2ML3
BR2,NR3D4R3D4BR2
510 DATA ND4R3D2L2F2D4BR2,0D4R3D2
L2U2R2BR2,RN4BR2,04R2U4BR2,03F2U
3BR2,D4EFU4BR2
520 DATA DF2D4L2UE2U2BR2,0FND2E2BR2
,R3D2D4R3D4BR2
530 DATA NR2D4R2U4BR2,0DND4BR2,R2
D2L2D2R2D4BR2,NR2D2NR2D2R2U4BR2
,D2R2D2U4BR2,NR2D2R2D2L2D4,04R2U2
L2D2BR2,R2ND4BR2,NR3D4R3D2ML2U2BR
2,NR2D2R2D2U4BR2
540 GOTO 430
550 DRAW"BR"+STR$(00)+"",+STR$(Y)
560 FOR K=1 TO LEN(M)
570 BR=MID$(M,K,1)
580 IF BR<>"R" AND BR<>"B" THEN DR
AW MUBR$(BR):GOTO 610
590 IF BR="" THEN N=0 ELSE N=ASC(
BR)-64
600 DRAW LEA 00
610 NEXT K
620 RETURN
630 POLS:SCREEN 1,0
640 XX=30:YY=30:AA="CAT":DRAW"C251
6":GOSUB 550
650 X0=100:Y0=90:AB="AND":DRAW"C20
8":GOSUB 550
660 X0=75:Y0=150:AB="MOUSE":DRAW"C
2516":GOSUB 550
670 FOR T=1 TO 4
680 PLAY"01":FOR N=1 TO 4:PLAY"125
5056FG40+":NEXT N
690 NEXT T
700 FOR T=0 TO 200:NEXT T
710 POLS
720 XX=30:YY=30:AB="LEVEL":DRAW"C2
516":GOSUB 550
730 SOUND 50,5:X0=30:Y0=90:AB="LEV
EL":DRAW"C2516":GOSUB 550
740 SOUND 100,5:X0=30:Y0=150:AB="L
EVEL":GOSUB 550
750 SOUND 150,5
760 X0=200:Y0=30:AB="1":DRAW"C2516
":GOSUB 550:SOUND 100,2
770 X0=200:Y0=90:AB="2":DRAW"C2516
":GOSUB 550:SOUND 100,2
780 X0=200:Y0=150:AB="3":DRAW"C251
6":GOSUB 550:SOUND 100,2
790 BR=INKEY#
800 IF BR="1" THEN W=30:CY=12:CX=1
2:RY=12:RX=12:GOTO 840
810 IF BR="2" THEN W=120:RY=12:RX=
12:CY=12:CO=12:GOTO 840
820 IF BR="3" THEN W=200:CX=24:CY=
24:RY=24:RX=24:GOTO 840
830 GOTO 790
840 POLS:PUT (0,0)-(24,24),HD,PSET
850 PUT (100,0)-(200,20),HD,PSET
860 LINE 100,72-(100,107),PSET,B
870 XC=10:YC=30
880 XR=170:YR=30
890 REM*****MAIN LOOP
900 PUT (10,30)-(24,50),CR,PSET
910 PUT (170,30)-(200,50),MR,PSET
920 FOR N=1 TO 20
930 BR="ABCEDFGHIJKLMNOPQRSTUVWXYZ
"
940 AB=MID$(BR,N,1)
950 XX=120:YY=82:DRAW"C2516":GOSUB
550
960 FOR Z=0 TO W
970 Z=INKEY#
980 IF Z=AB THEN GOSUB 1200:GOTO
1010
990 IF Z<>AB AND Z<>" " THEN GOSUB
51070
1000 NEXT Z
1010 GOSUB 1070
1020 XX=120:YY=82:DRAW"C2516":GOSUB
550
1030 IF XR=XC AND YR=YC THEN 1060
1040 IF XR<170 AND XR>130 AND YR<3
0 THEN 1030
1050 NEXT X
1060 GOTO 920
1070 IF XR=XC AND YR=YC THEN 1090
1080 IF XC<=10 AND YC<=30 THEN GOTO
1120
1090 IF XC<=100 AND YC<=30 AND YC<
140 THEN GOTO 1170
1100 IF XC<=100 OR XC<=60 AND YC<
=140 THEN GOTO 1210
1110 IF XC<=60 AND YC<=140 OR YC<=
30 THEN GOTO 1250
1120 REM RIGHT
1130 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1140 XC=XC+CX
1150 PUT (X,Y)-(X+24,Y+24),CR,0
R
1160 RETURN
1170 REM DOWN
1180 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1190 YC=YC+CY:PUT (X,Y)-(X+24,YC
+24),CR,CR
1200 RETURN
1210 REM BACK LEFT
1220 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1230 XC=XC-CX:PUT (X,Y)-(X+24,YC
+24),CL,CR
1240 RETURN
1250 REM UP LEFT
1260 PUT (X,Y)-(X+24,Y+24),BL,P
SET
1270 YC=YC-CY:PUT (X,Y)-(X+24,YC

```

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```

1240 CL=OR
1250 RETURN
1260 IF XM=170 AND YH=30 THEN GOT
O 1300
1280 IF XM=100 AND YH=30 AND YH=
140 THEN GOTO 1300
1310 IF XM=100 OR XM=60 AND YH=
140 THEN GOTO 1400
1320 IF XM=60 AND YH=140 OR YH=
35 THEN GOTO 1400
1330 REM RIGHT
1340 PUT C0,YH - C0H+24,YH+24 ,BL,P
SET
1350 XM=XM+MX
1360 PUT C0,YH - C0H+24,YH+24 ,HR,P
SET
1370 RETURN
1380 REM DOWN
1390 PUT C0,YH - C0H+24,YH+24 ,BL,P
SET
1400 YH=YH+MY
1410 PUT C0,YH - C0H+24,YH+24 ,RD,P
SET
1420 RETURN
1430 REM LEFT
1440 PUT C0,YH - C0H+24,YH+24 ,BL,P
SET
1450 XM=XM-MX
1460 PUT C0,YH - C0H+24,YH+24 ,HL,P
SET
1470 RETURN
1480 REM UP
1490 PUT C0,YH - C0H+24,YH+24 ,BL,P
SET
1500 YH=YH-MY
1510 PUT C0,YH - C0H+24,YH+24 ,MU,P
SET
1520 RETURN
1530 CX=60:YY=10:G0="YOU ARE HOME"
DRAW"C300":G0SUB 550
1540 PUT C0,YH - C0H+24,YH+24 ,BL,P
SET
1550 PLAY"04V0112L3C0-GLAGL66FL3E
0"
1560 PLAY"L66L66FL30BL66FL66FL60
L2C"
1570 GOTO 1600
1580 CX=60:YY=10:G0="PUNCH PUNCH"
DRAW"C300":G0SUB 550
1590 PLAY"01V3112L400L600L40-440GF
40"
1600 PCL50:XX=40:YY=100:G0="PLAY A
GARDN YES OR NO":DRAW"C200":G0SUB
550
1610 G0=INKEY$:IF G0="Y" THEN 710
1620 IF G0="N" THEN END
1630 GOTO 1610

```



Computer

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The Dragon's Claw

Roy Coates looks at an interesting new development in Dragon peripherals

THE DRAGON'S CLAW is one of the many hardware add-ons that should have appeared a couple of years ago. If it had then the Dragon may have enjoyed a far more interesting and widespread user base than it currently does.

The Claw is a standard sized cartridge which has three sockets protruding from it. There are two on the top of the cartridge, the first being an eight-bit Centronics I/O port, and the second being an emulation of the BBC computer's "User Port". The third connector is something that should be found on a lot more of the add-ons on the market. It is simply an extension of the Dragon's cartridge port which allows another cartridge such as another Claw or a disk interface to remain connected to the Dragon whilst the Claw is in use. With this in mind, the Claw has been designed in such a way that it may be configured to reside in one of four different places within the Dragon's address space. Although none of these addresses are known to conflict with those used by other cartridge add-ons, it does mean that up to four Claws may be connected together.

Heart

The heart of the Dragon's Claw is the tried and tested Motorola 6802 Versatile Interface Adaptor (VIA). This is a very clever device which may be set up to handle just about any type of I/O that may be required. As mentioned in the Claw manual, it would take many reams of paper to illustrate all of the possible applications of the 6802 VIA and so a brief description of the device will have to



The Dragon's Claw — I am sure it will prove to be a success.

suffice. The 6802 contains 16 eight-bit registers and these are individually addressable through four address lines on the chip. Address decoding is provided within the cartridge to allow the placing of the cartridge at the four different addresses as mentioned above.

The documentation that is supplied with the Claw consists of the now standard A4 sized booklet and contains a description of the Claw along with a programming example and the Data sheet for the VIA chip.

With the software to support it, the Claw may be used to drive all the wonderful peripherals that have appeared for the

BBC micro such as the Penman plotter, Robot arm and the Snap-Camera pictured here. Programming the Claw to interface to other devices does require a basic knowledge of interfacing, but an example is provided and would give a good starting point for someone interested in the often fascinating task of computing.

The Snap-Camera is surprisingly small, fitting in a plastic case measuring only 2" x 2" x 1" and is fitted with a small 28mm Pentax lens. A tripod mounting bush has thoughtfully been provided although it will require a larger than average mounting bolt as the bush is recessed into the case. A length of ribbon cable about six feet long is used to connect the camera to the Dragon's Claw and the plug is a very tight fit against the side of the Dragon. Although I usually assure you that this is intentional, I must admit to being a little wary when moving the camera about in case the cable should snag on something and pull the cartridge out. It didn't and I was not prepared to see how hard you had to pull to-led out!

The demonstration software provided with the camera is on cassette although instructions are given for saving this to disk. The program consists of a BASIC program and one machine code program. A source listing of the machine code is given in the manual with descriptions of all the routines and how to implement them in your own programs.

Having loaded the software, the camera worked straight away and I was a little surprised at being myself asked on the



computer screen. (If you have seen "Titan" you will understand why!) The demo program is in three parts, the first part will display a picture as seen by the camera and will calculate an average exposure to build up the image on the screen. The second part of the program allows you to alter the exposure time manually which does give a lot more scope to the final picture quality, and the final part of the demo performs a colour enhancement of the last exposure as used in many scientific applications to enhance certain areas of the picture.

Having quickly experimented with varying objects, it was found that the camera has a particularly narrow field of vision and is best using objects no more than about four feet away. Strong lighting tends to "bleach" the image, thus losing a lot of the detail. The light from a normal 60 watt domestic bulb was found to be about the best source of light. The quality of the picture obtained varies enormously depending on the content. Items which have a great deal of contrast such as a newspaper or a cartoon appear far more clearly than would a coloured object. As mentioned in the camera manual, the Optikal RAM is particularly sensitive to the colour red, and so anything that is red tends to come out as if it was pure white.

Beastie

Luddite have already released the Snap-Dragon camera with software to drive the unit through the Dragon's Claw



Portrait of the author as a computer screen.

and now have a "Beasty" robot arm working happily. They will be demonstrating this at the forthcoming 6666 show. Future devices may include some of the turtles available for the BBC micro and possibly a home satellite weather station. Obviously this will depend on the market response to this product but the Claw is

the key that opens up so many doors as far as add-ons go that I am sure that it will prove to be a success.

Over the next few weeks I shall be trying the Claw with a commercial robot arm, and I shall also be trying some of the suggested applications for the camera in the camera manual. Watch this space!



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Competition Corner

Answers to Competition Corner,
Dragon User, 12-13 Little Newport
Street, London WC2H 7PP.

THE GAME of Nim is one of the oldest games for two players, and certainly it is a variation to be found in most countries and cultures. Nim is a game that can be played using the simplest of materials such as pebbles on the beach or coins on the table. It can also be adapted for playing by computer.

The rules of the game are simple. Several pebbles are laid out in a number of rows and players take it in turns to remove one or more pebbles. The only limitation is that at each go the pebbles must all come from the same row. The winner is the player to take the last pebble.

For example, in the game below a player could remove either one, two, three, or four pebbles from row 'A', or either one or both pebbles from row 'B', or he might elect to remove from one to all seven pebbles from row 'C'.

```
A * * * * *
B * *
C * * * * * *
```

In fact, the only safe move would be to take just one pebble from row 'C'. Unfortunately space doesn't permit a full discussion as to why this should be so, but readers who are interested might get some clue from analysing the program given below and seeing how the computer decides on its best move. That this method is related to the binary method of counting might suggest why the game of Nim is suited to computer analysis. Indeed a machine called the 'Nimron' was built by the Westinghouse Electric Corporation and exhibited in New York in 1940. This machine weighed a ton and was limited to playing with only four rows with a maximum of seven 'pebbles' in each. The version for the Dragon gives more adds variety to the game by generating a random number of rows with up to 50 'pebbles' in each row. You will find that as the computer prints out the 'pebbles', each block of five is in a different colour. This has no significance relating to the game and is done simply to make counting the pebbles in each row easier.

Have a happy Christmas!

For the Christmas Competition we are turning to the adventures of the well-known anthropologist and explorer, Mr. Symphysis Offenknighly who has just returned from the remote East European country of Pandemonia.

This country is so remote that the conventional Arabic system of numbers is still unknown. Instead of using the 10 digits which we recognise as zero to nine, the Pandemonians use 10 written symbols which bear a striking resemblance to our letters A, B, C, D, E, F, G, H, I, and J

(though not necessarily in this order).

Not surprisingly books of mathematical tables are in sale in the local shops, and Mr. O-K, mistaking one for an English Pandemonian phrase book, caused a great deal of confusion by reading from a page of square numbers. This is perhaps understandable if it is realised that amongst this table of squares in the notation of Pandemonia are the words HAD, CABBAGE, and DEFIED.

Can you determine which letter represents which digit?

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Prize

THIS MONTH we have a special prize, one of the latest, and perhaps best games for the Dragon. Micro-rodex have kindly agreed to donate 25 copies of Treasures, their latest graphic adventure — and if you want to find out just how good it is, turn to the reviews page where Mike Gerard gives it the once over.

Rules

50 WIN a copy of Treasures you must first show the answer to the above problem, and, secondly, demonstrate how you solved it with the use of a Basic program written on your Dragon.

Please do not send in a cassette

containing your answer.

Make sure your name and address is printed clearly on your entry and mark the envelope December competition. Envelopes which do not say which month you are entering will be disqualified.

As a tie-breaker, complete the following sentence in 10 words or less: "I want to visit a Dark Star because ..."

Entries must reach Dragon User by the last working day in December. The winners will be announced in the March 1986 issue. The editor's decision is final and no correspondence will be entered into.

WMS:HRP

IT NEVER ceases to amaze us —

every month, people win prizes! And September was no different.

The following clever 15 have managed to get themselves copies of such Chuckle Egg and Screaming Abacus from Art & Software. They are Richard Byrne of Gloucestershire, Eric Peter Gilling of Putney, E. Herman of Addlestone, D. Medford of Storrington, M. Stanton of Stoke Newington, Karen Mowat of Harlow, R. Lawson of Kettering, D. Hunt of Bolton-le-Sands, C. Jones of Llanerch, Luis Martinez of San Sebastian, Spain, R. Hart of Knaresborough, Kevin Desmond of Cork, Eire, Clive Fries Milner of Redditch, Warwick, Rachel Edwards of Segefield, and Kim Hooley of Rugby.

St. George now has two choices!

Red or green will slay the Dragon

- ▲ Nylon encased-Steel shafted joystick with ball and socket joint.
- ▲ Fast sprung return to centre.
- ▲ Graphite wiper linear potentiometers.
- ▲ 12 Months Guarantee.
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Complete control at your fingertips

The smooth control of the Voltmace delta sprung return joystick is now available to Dragon owners. Each joystick has been individually tested before it leaves our factory, following extensive robot testing to prove the design (we tested in more than a million times). This means that not only will your joystick be strong, tough and reliable, but it ensures long life, accurate control and with the choice of red or green fire buttons, gives instant recognition between the left and right joysticks.

If you are not completely satisfied with the delta 3d, return it to us within seven days for a full refund.



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Callers welcome at the factory - Monday to Friday.

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Action packed arcade adventure with 64 screens, monsters, ghosts, laser guns, shotguns & a smart bomb. Tandy version will run on Dragon 3204

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